

**SPACE ASSEMBLY, MAINTENANCE, AND SERVICING STUDY (SAMSS)**

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U.S. Air Force

***AGENDA***

- o BACKGROUND
- o SAMS CONCEPT
- o SAMS STUDY
- o RELATED STUDIES
- o SUMMARY

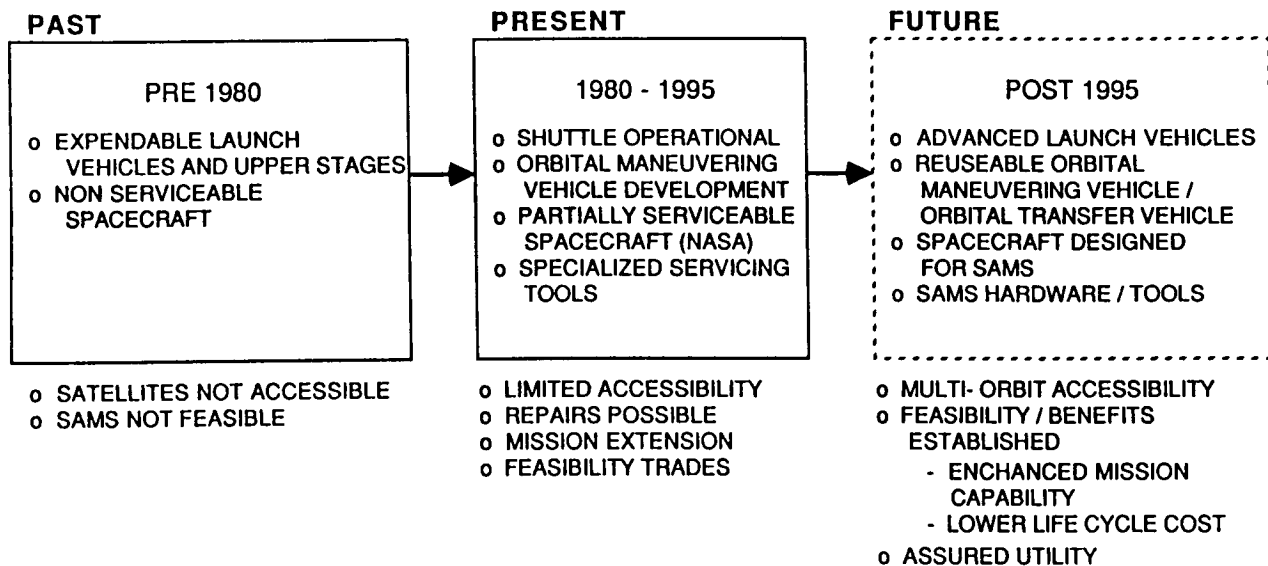
***BACKGROUND***

***SAMS DEFINITIONS***

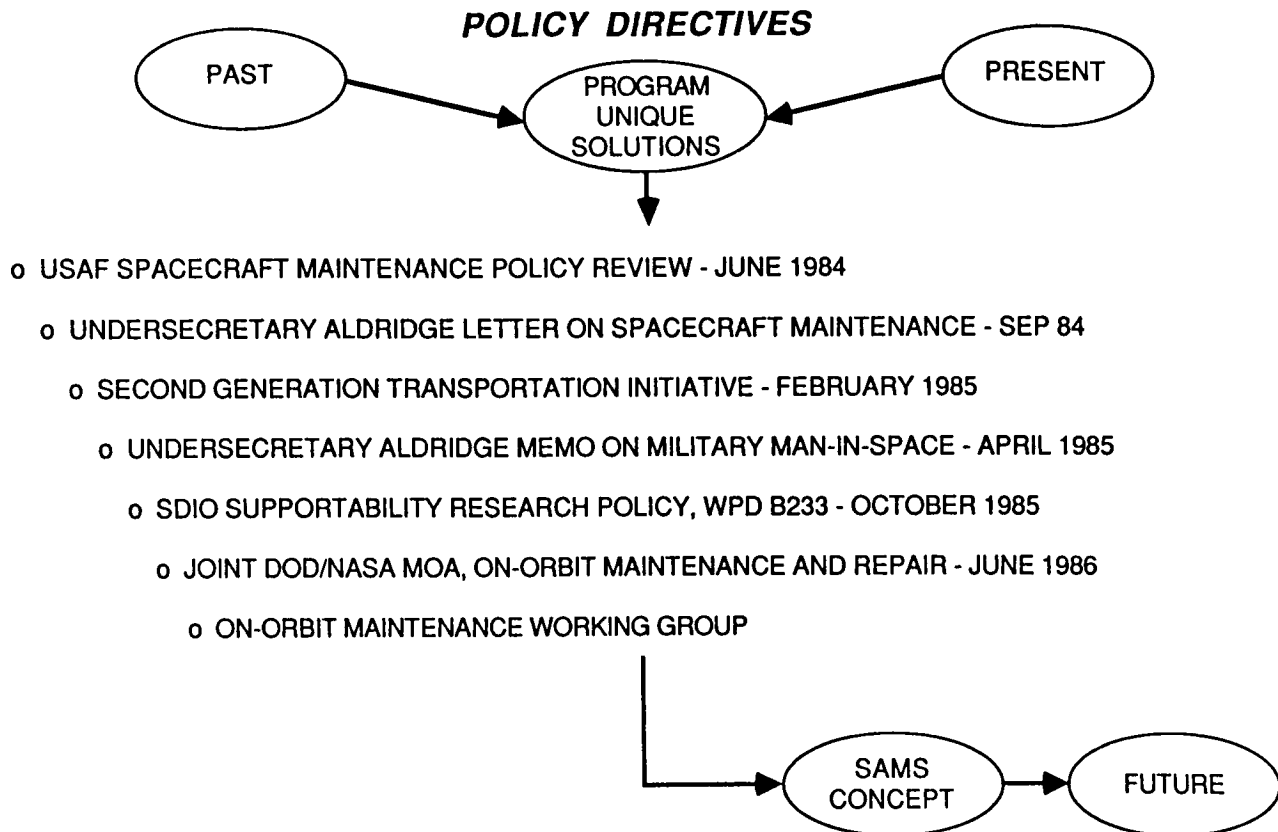
**SPACE**

- o ASSEMBLY: CONSTRUCTION, ALIGNMENT,  
AND CALIBRATION
- o MAINTENANCE: TEST/CHECKOUT, MODULE REPLACEMENT,  
REPAIR, AND MODIFICATION
- o SERVICING: CONSUMABLE RESUPPLY

## EVOLUTION OF SAMS



ACCESSIBLE: REACH AND PERFORM SAMS OPERATIONS ON SPACECRAFT



## **SAMS GOALS**

- o DEFINE AND ESTABLISH SAMS CAPABILITIES TO MEET REQUIREMENTS FOR:
  - IMPROVED SPACE SYSTEMS
    - CAPABLE
    - FLEXIBLE
    - RESPONSIVE
    - AFFORDABLE

## **SAMS CONCEPT**

### **SAMS ROADMAP**

#### INITIAL SAMS CONCEPT DEFINITION

##### SAMS CONCEPTS (1986-1991)

- o INITIAL SAMS STUDY (CURRENT EFFORT)
- o PROOF-OF-CONCEPT HARDWARE / TECHNOLOGY DEMONSTRATIONS
- o INTEGRATED IMPLEMENTATION APPROACH

#### INITIAL DEVELOPMENT

##### TRANSITION TO INITIAL SUPPORT CAPABILITY (ISC) (1989-1995)

- o SAMS FULL SCALE ENGINEERING DEVELOPMENT
- o VERIFICATION/VALIDATION
- o SAMS ISC - 1995

#### FULL CAPABILITY

##### TRANSITION TO FULL SUPPORT CAPABILITY (FSC) (1995-2010)

- o OPERATIONAL SAMS SYSTEMS
- o HARDWARE / TOOLS
- o SAMS FSC - 2010

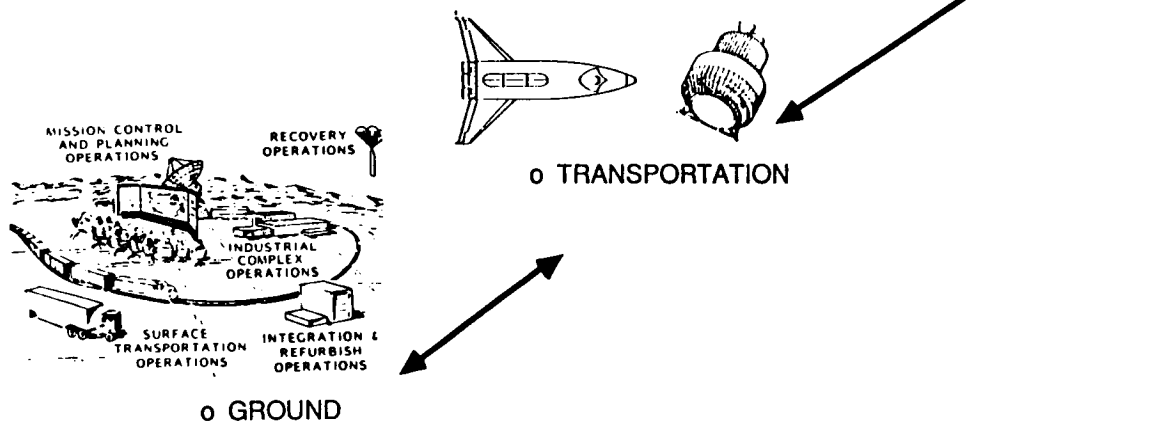
## **SAMS APPROACH**

- o INTEGRATED APPROACH

- DoD
- NASA
- TECHNOLOGIST / DESIGNER / USER INTERACTION

- o AVOID DUPLICATION OF EFFORT

- o ASSESS IMPACT IN ALL AREAS:

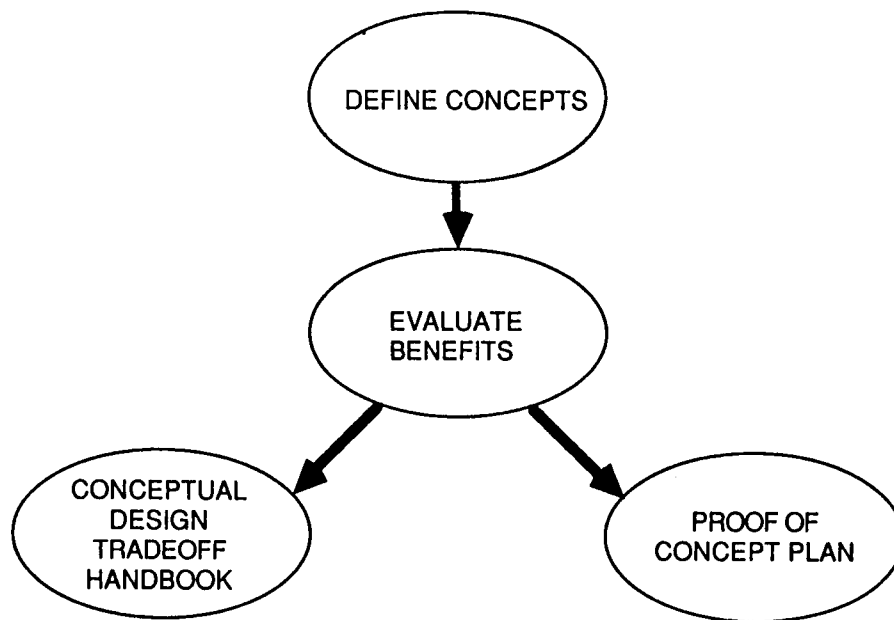


## **SAMS STUDY**

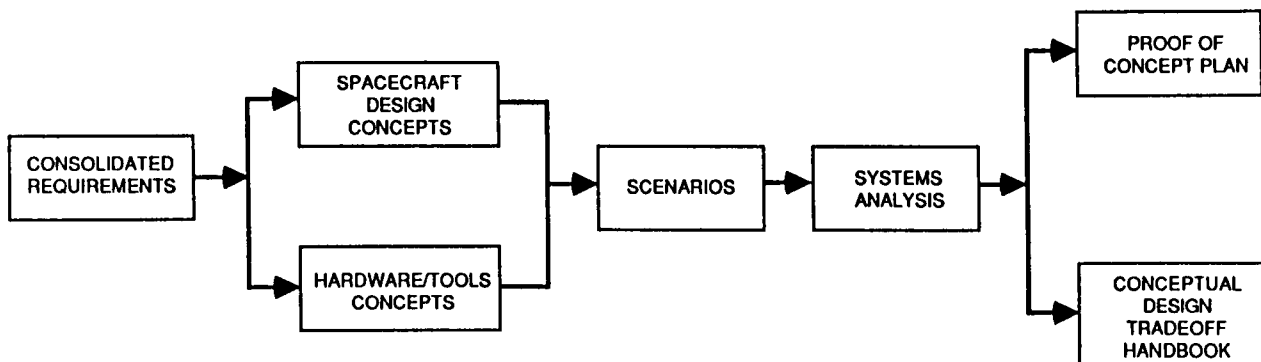
### **SAMS STUDY DESCRIPTION**

- o OBJECTIVES
- o STUDY APPROACH
- o ADVISORY PANEL
- o SCHEDULE / MILESTONES
- o FUNDING

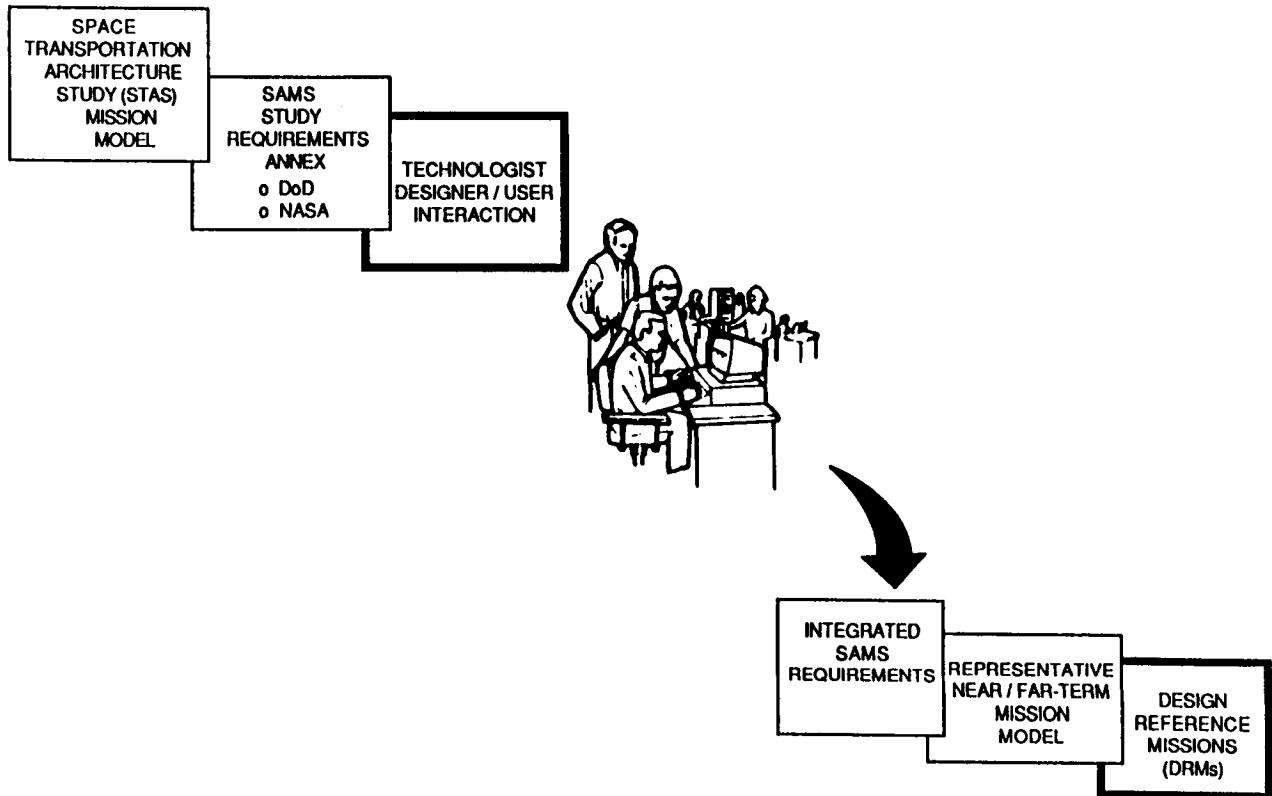
## OBJECTIVES



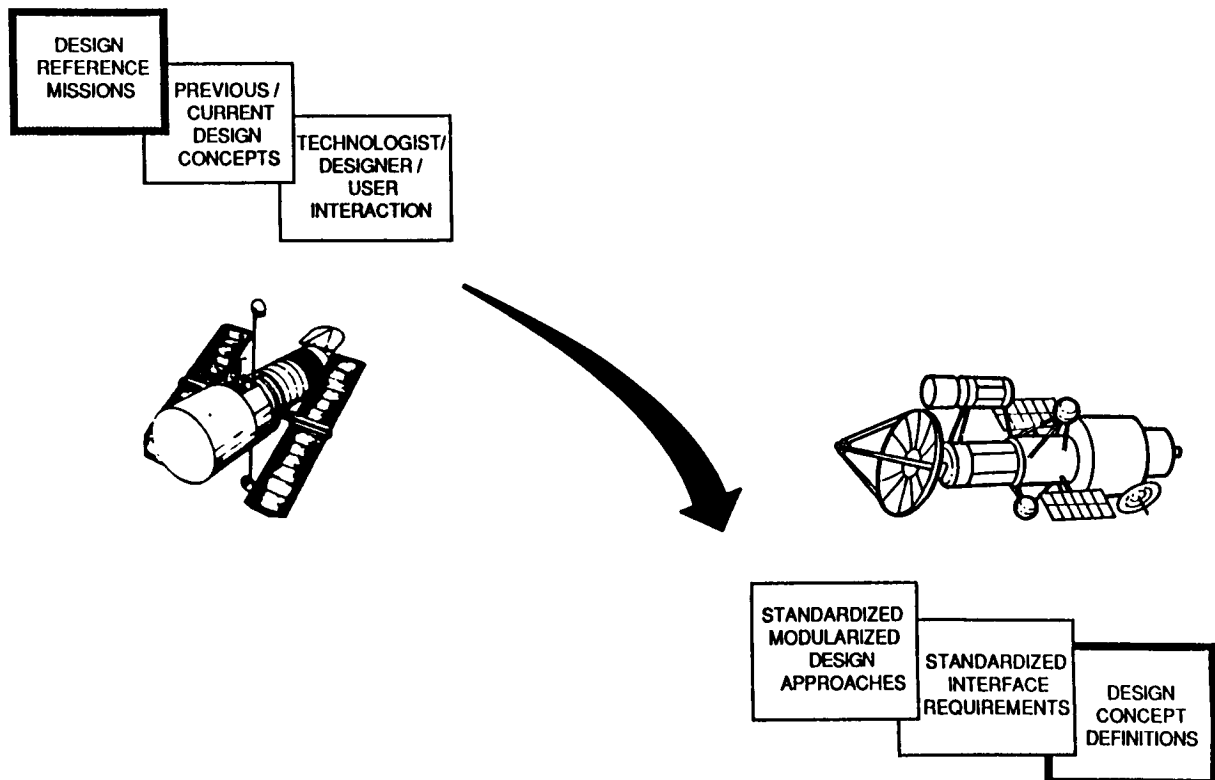
## SAMS STUDY APPROACH



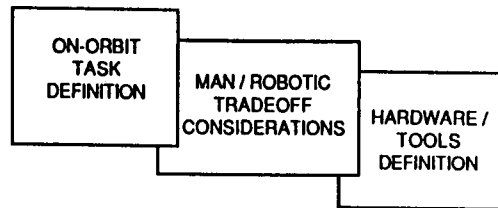
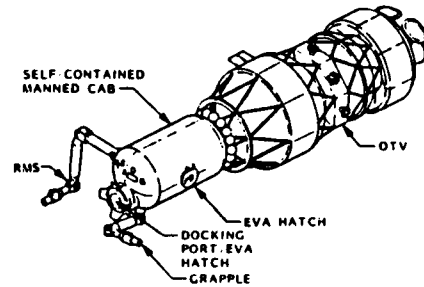
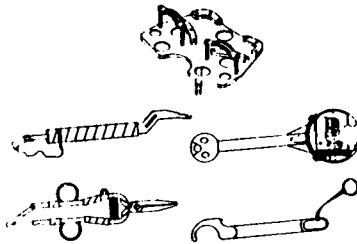
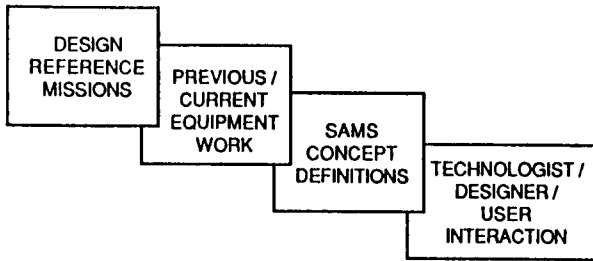
## CONSOLIDATED REQUIREMENTS



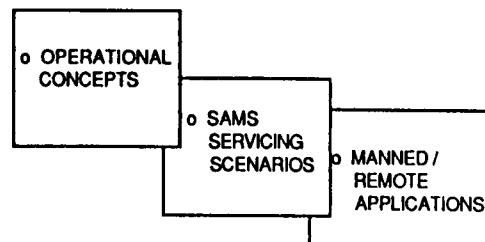
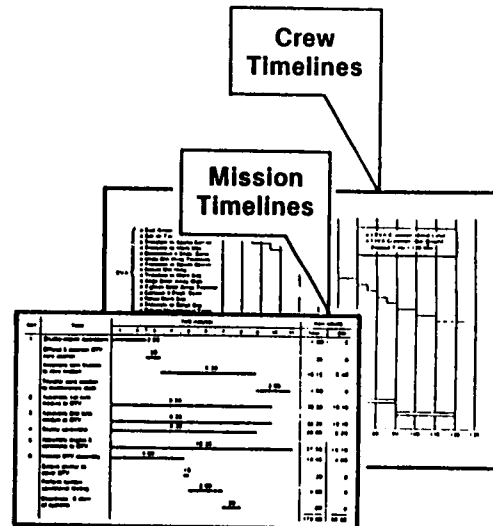
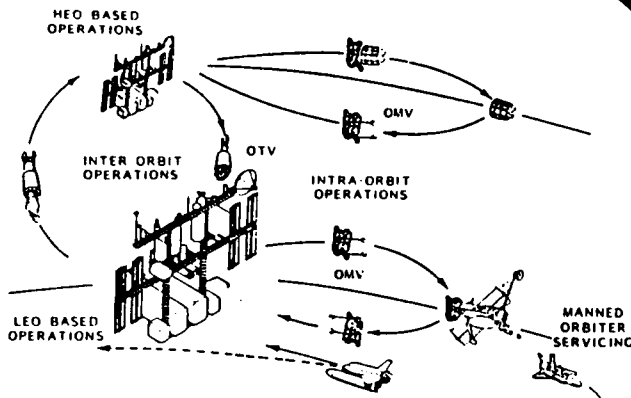
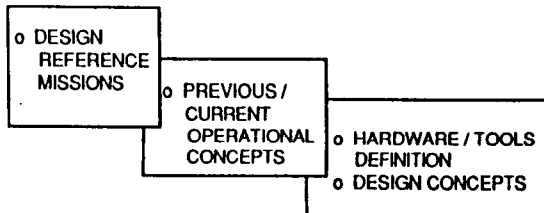
## SPACECRAFT DESIGN CONCEPTS



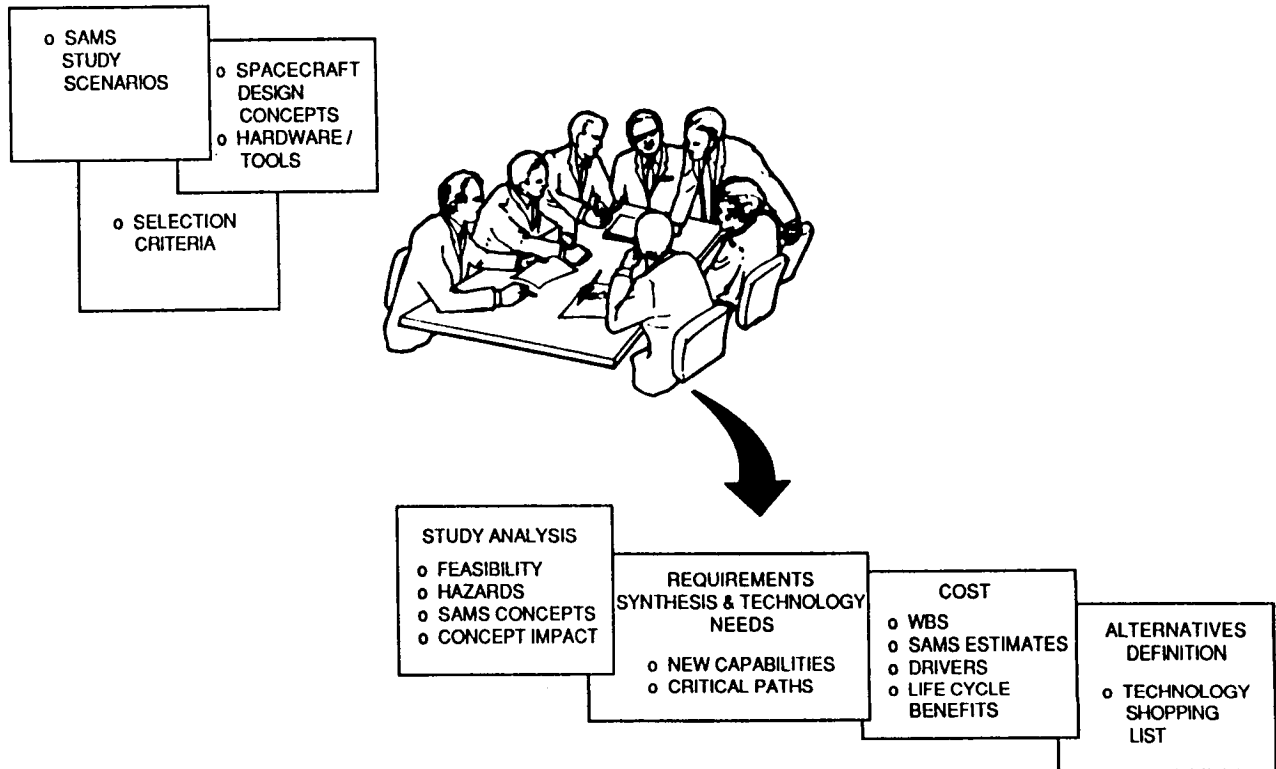
## HARDWARE/TOOLS CONCEPTS



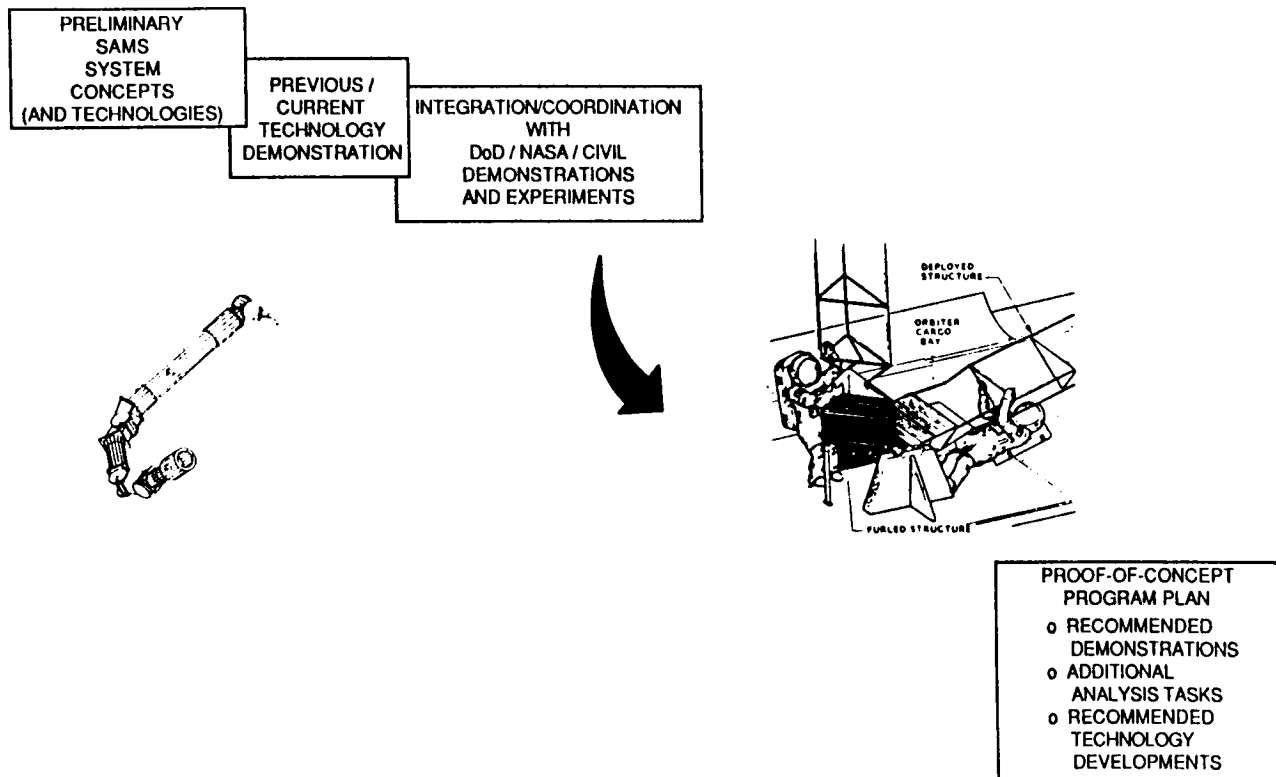
## SCENARIOS



## SYSTEMS ANALYSIS



## PROOF-OF-CONCEPT PLAN (CONCEPT EVALUATION)

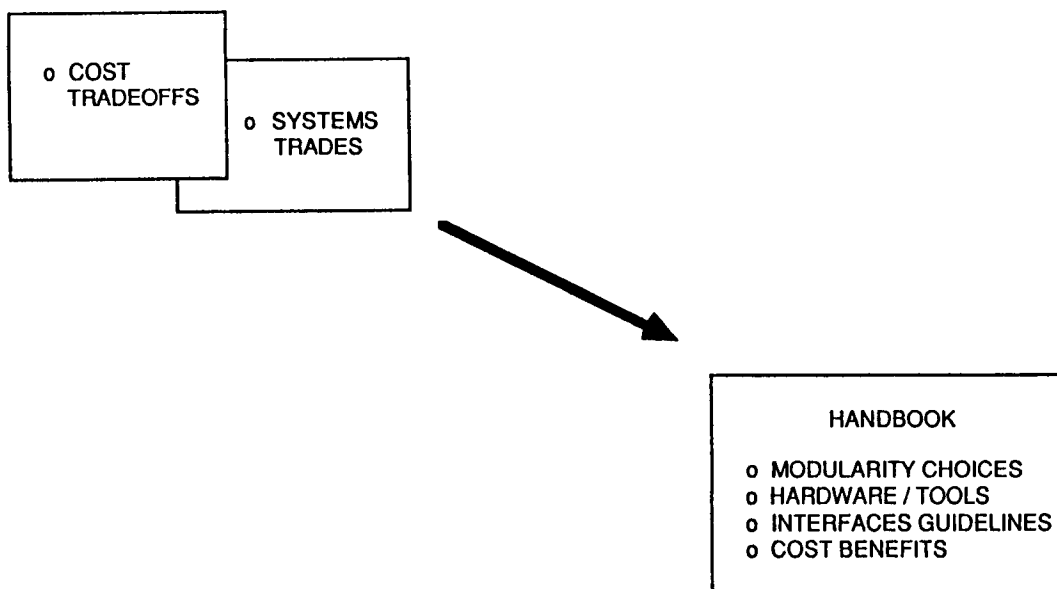




## **SAMS ADVISORY PANEL**

AREA	FOCAL POINT
REQUIREMENTS	ROD LOCHMANN, AEROSPACE CORP.
S / C DESIGN	LT COL CHARLES BROWN, AFSC / SD (CGX)
HARDWARE / TOOLS	GORDON RYSAVY, NASA / JSC (EX2)
GOV'T ASTRONAUT REVIEW BOARD	LT COL JERRY ROSS, NASA / JSC (CB)
SAMS SCENARIOS / SYSTEM ANALYSIS	MAJ LOUISE JACKSON, AFSC / SD (XR)
LOGISTICS SUPPORTABILITY	COL JAMES GRAHAM, SDIO / SY
TECHNOLOGY	GEORGE LEVIN, HQ NASA / MT
POLICY / PROGRAMMATICS	LT COL RICK NELSON, HQ USAF / LE
STANDARDIZATION	LT COL GEORGE SAWAYA AFSC / SD (ALF)

## **CONCEPTUAL DESIGN TRADEOFF HANDBOOK**



## **RELATED STUDIES INTERACTION**

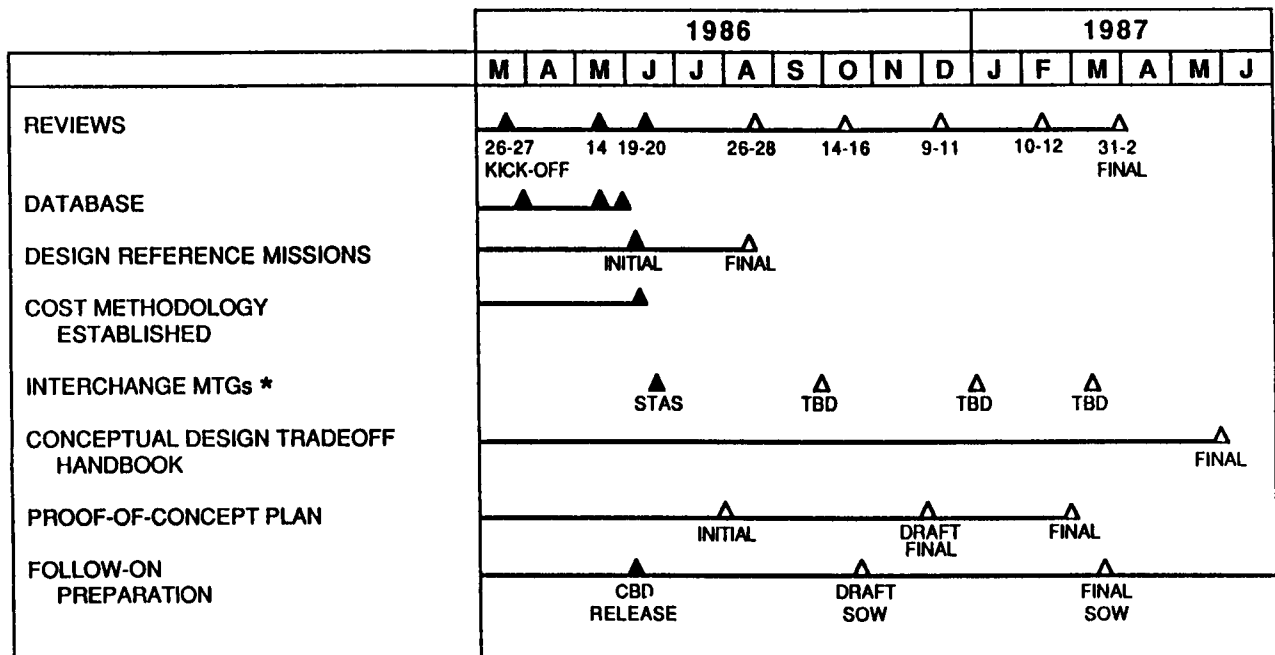
STUDY	OPR / ORG	CONTRACTORS
SPACE TRANSPORTATION ARCHITECTURE STUDY	LT COL CORT DOROCHE AFSC / SD (CFP)	ROCKWELL GENERAL DYNAMICS MARTIN-MARIETTA BOEING
STANDARDIZATION STUDY	LT JANE DAUGHERTY AFSC / SD (YO)	ARINC
ON-ORBIT MAINTENANCE REPAIR STUDY (POLICY)	LT COL RICK NELSON HQ USAF / LEY	TBD
ORBITAL SPACECRAFT CONSUMABLES RESUPPLY SYSTEM (OSCRS) STUDY	NASA / JSC	FAIRCHILD MARTIN-MARIETTA ROCKWELL
SPACE STATION STUDY	NASA / JSC	RI, TRW, RCA, et al
ORBITAL MANEUVERING VEHICLE	NASA / MSFC	TRW
LOGISTICS INTEGRATION (LSA) STUDY	COL JIM GRAHAM SDIO / SY	TDB
SDI ARCHITECTURE STUDIES (PHASE II AND SARS)	SDIO	SAIC SPARTA TRW ROCKWELL MARTIN-MARIETTA, et al
KEW / DEW / SENSORS STUDIES	SDIO / AF / ARMY	VARIOUS

## **SAMS STUDY TEAM**

GOVERNMENT
<ul style="list-style-type: none"> <li>o SPACE DIVISION (YO)</li> <li>o SDIO(SY)</li> <li>o HQ NASA(MT)</li> </ul>

CONTRACTORS	
TRW GRUMMAN Mc DONNELL DOUGLAS BOOZ ALLEN HAMILTON ADVANCED TECHNOLOGY	LOCKHEED BOEING HONEYWELL ILLINOIS INSTITUTE OF TECHNOLOGY CARNEGIE MELLON LIFE SUPPORT SYSTEMS

## SCHEDULE / MILESTONES



\* POTENTIAL INTERCHANGES: STAS, LSA, SDI SYSTEMS ARCHITECTURE, TECHNOLOGY PROGRAMS

## SUMMARY

- o EVOLVING NEED FOR SAMS
- o SAMS POLICIES ESTABLISHED
- o SAMS CONCEPT DEFINED
- o INITIAL STUDY UNDERWAY



- o IMPROVED SPACE SYSTEM OPERATIONS
  - CAPABLE
  - FLEXIBLE
  - RESPONSIVE
  - AFFORDABLE